

A Historical Reanalysis of the Regina Cyclone

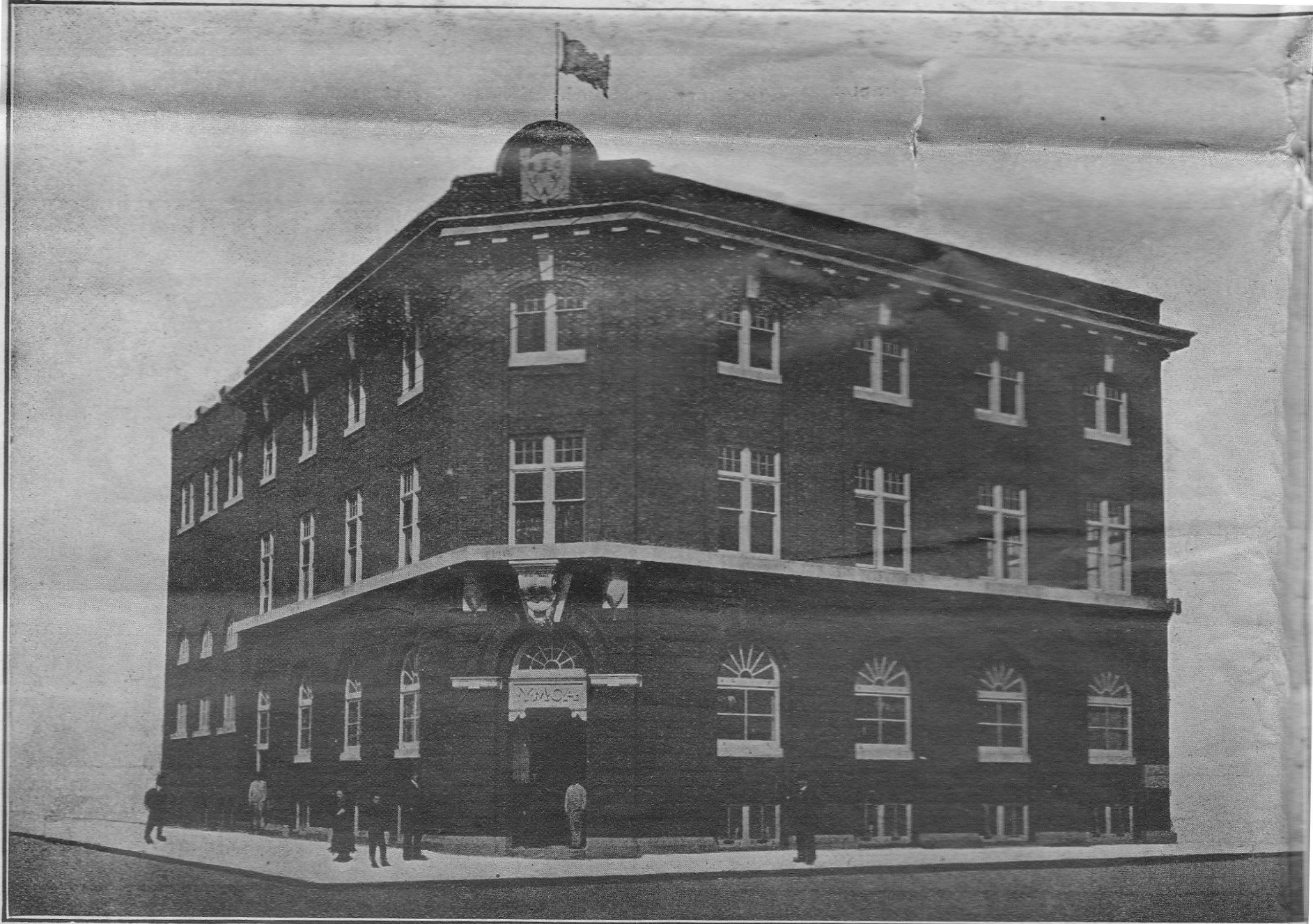
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- Motivation
- Photographs
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Motivation

- Regina is about 70 miles north of the northern extent of the Glasgow, MT County Warning Area
- Be prepared to recognize a pattern that would favor destructive tornadoes in Northeast Montana



The Young Men's Christian Association before the storm.



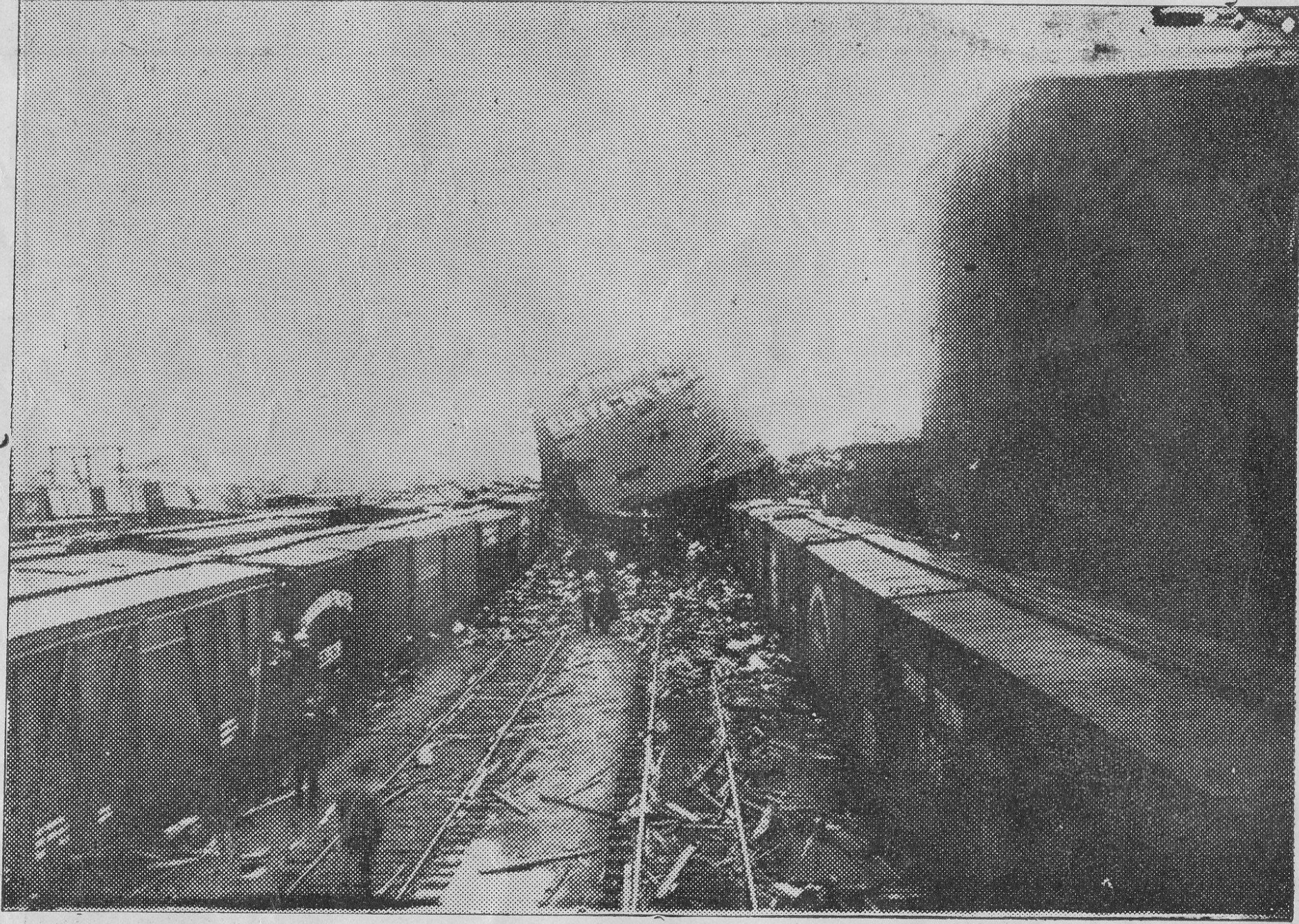
The Young Men's Christian Association after the blow. Many people were injured in this building.



Here were some of the finest residences in Regina. The remains of homes on Lorne Street.



View of C.P.R. yards after the tornado. Cars were carried a hundred feet or more.



Another view of C.P.R. yards. Note the grain elevator blown across the tracks.



Scene in C. P. R. yards. Note the grain elevator turned over on the cars.

Historical Background

“Cyclone struck Regina, 16.50k. City in ruins”

- Struck 4:50 CST Sunday 30 June 1912
- Intensity: F4 (333-418km/hr)
- Formed 18km south of Regina?
- Funnel was 400m wide?
- Duration: 3 min or 20 min?

Historical Background

- Deadliest Tornado in Canadian History
- 28 Killed
- 2500 Homeless
- 1.2 million in property damage
- Took nearly 40 years to pay off loans
- Homeless financially responsible for shelter

Historical Background

- Occurred the day prior to Dominion Day
- Very hot and humid day
- Dramatic Survival Stories and Tragic Stories

Synoptic Highlights

- Weekly Forecast Issued 23 June 1912

“The pressure distribution over the American Continent and the adjacent oceans is such as to indicate that the coming week will be one of warm and generally fair weather over the Northern and Middle States east of the Rocky Mountains, while in the Southern State and generally west of the Rocky Mountains temperatures will average near the normal with local rains. The precipitation during the week will be light and local. It is not probable that a well-defined depression will cross the country during the week.” [Monthly Weather Review, June 1912]

Synoptic Highlights

- *“On the last day of the month a destructive tornado visited the city of Regina in the Province of Saskatchewan in western Canada about 6 p.m. Three hundred houses are reported destroyed and many persons killed.”* [Monthly Weather Review, 1912]

Synoptic Highlights

- Very Warm temperatures extended well north into high plains of North America the week prior to the tornado
- A strong cold front moved into intermountain west of North America
- Surface low was situated south of Regina the day of the tornado

30 June Maximum Temperatures

■ Williston, ND	98
■ Glendive, MT	93
■ Saskatoon, SK	88
■ Regina, SK	86
■ Glasgow, MT	80
■ Billings, MT	80
■ Medicine Hat, AB	75
■ Havre, MT	67
■ Cut Bank, MT	59
■ Calgary, AB	51

Daily Max Temperature Trend

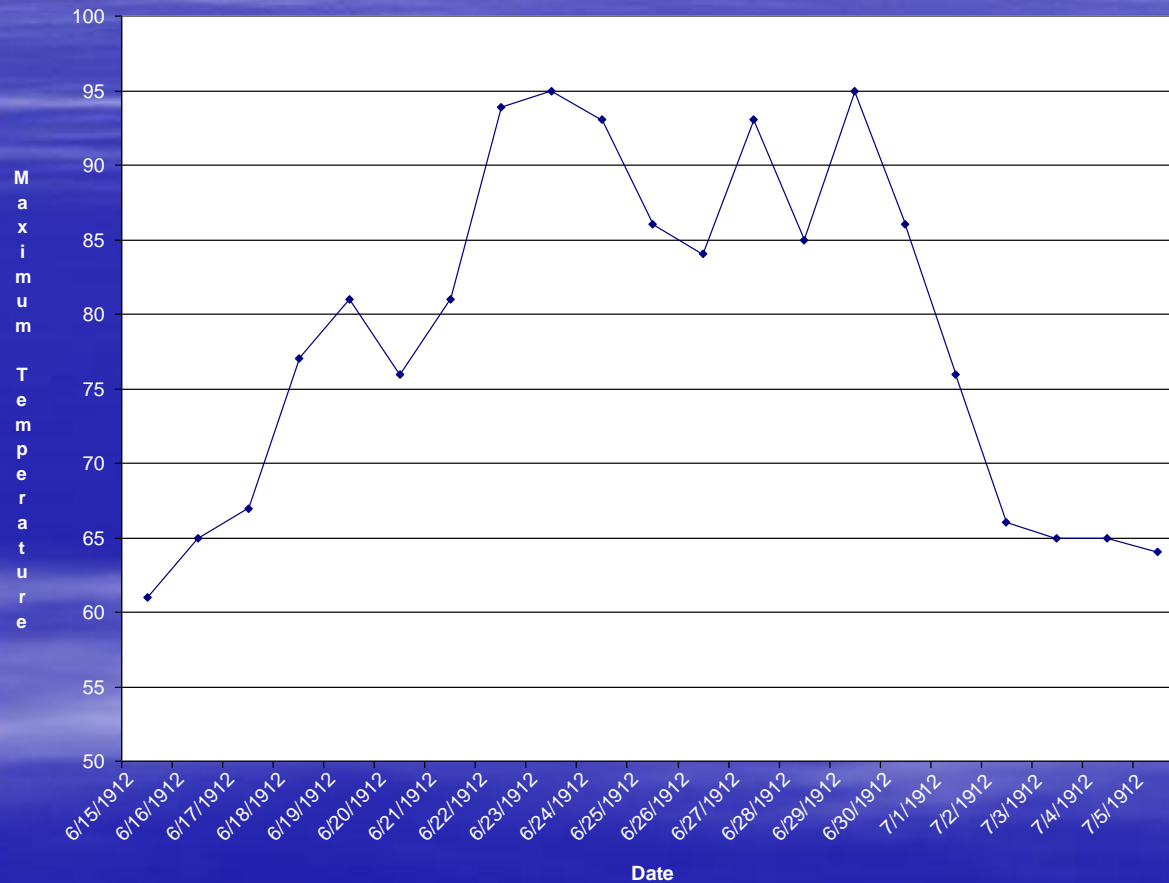
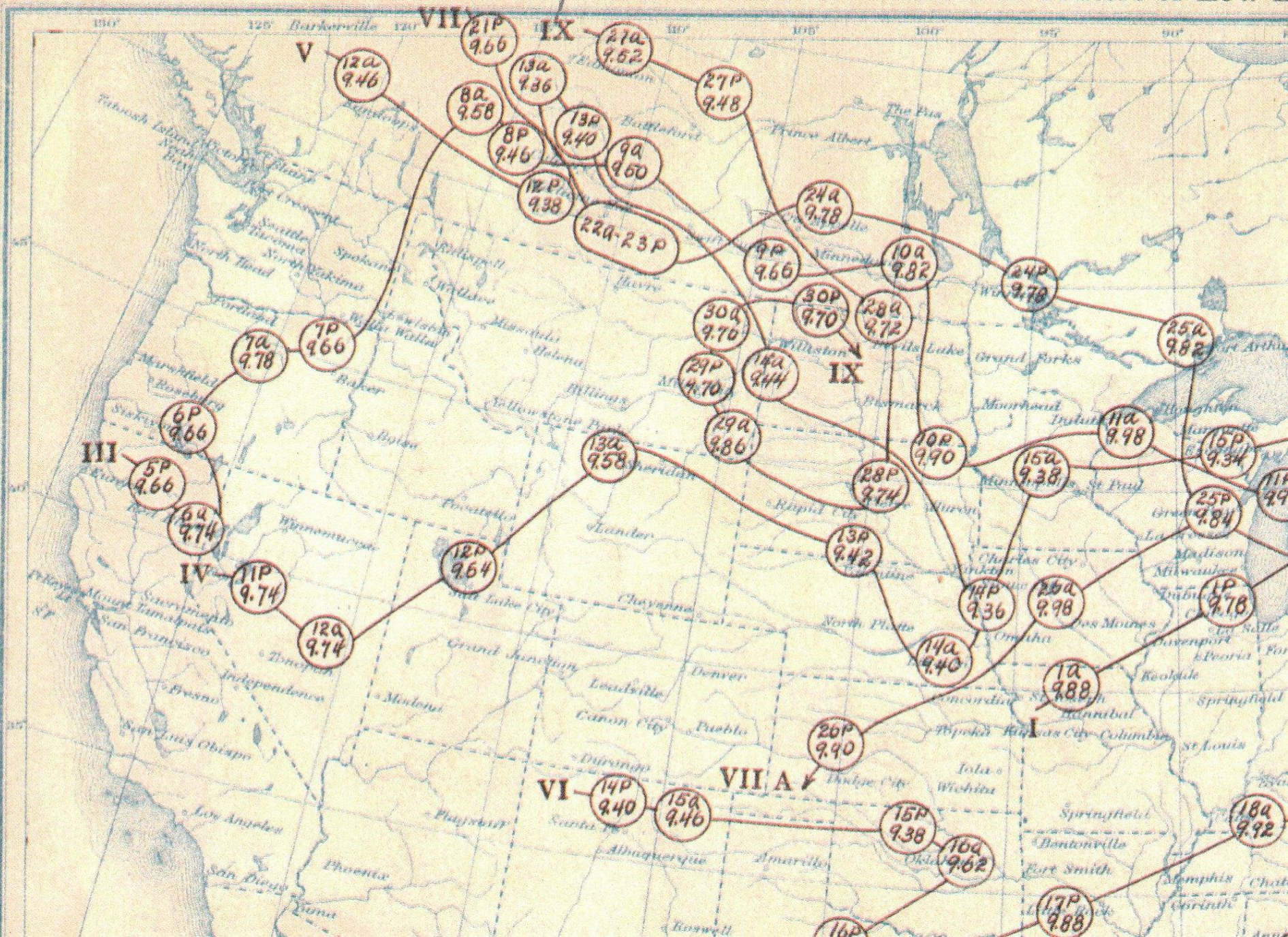


Chart III. Tracks of Centers of Low Areas, June, 1912.





WILLIS L. MOORE, CHIEF

Washington, D. C., Friday, June 28, 1912—8 A. M.

[illegible]

FOURCAST TILL 3 P. M. SATURDAY

For Mississippi, generally fair tonight and Saturday; showers in southern and central portions tonight; light to moderate westerly winds.

For Western Pennsylvania, Tennessee, Kentucky, Western New York, Ohio, and Indiana, generally 8:30 to 9:00 p.m. and Saturday, midnight to 1:00 a.m.

For the Great Lakes, light to moderate with occasional drizzle and generally fair weather tonight and Sunday.

For Illinois, and Wisconsin, fair tonight; warmer in eastern portions Saturday fair.
For Minnesota, fair, with cooler in western portion to night and Saturday.
For Iowa, fair to night; cooler in northwest

For Milwaukee, fair to night; warmer in southern portion. Saturday fair.

High storm winds of storm number 1 were shown in the

...the water
falls steadily a
join near or
chilling to with
points between
proceeding from
on east of the

Northwest by northwest
will be indicated by
the

When Henry
arrives during
the night, he
finds the wind in
the east.

[illegible][illegible]

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

WILLIS L. MOORE CHIEF

WEATHER CONDITIONS AND GENERAL PURCHASES

For Calcutta, New Mexico, and Antigua,
 find steamer to-night or Friday.
 For Vinal, local steamer to-night or Monday;
 under in northern port to to-night.
 For Washington, full to-night. Sunday her;
 under in eastern port.
 For Oregon, full to-night and Sunday.
 For Mexico, full, along steamer steamer and
 under this afternoon and to-night in western
 port. Sunday her; under in eastern port.

WIND-BAROMETER INDICATIONS.
From the wind set in, four points between north and northeast and falls slowly a storm is approaching from the west or northwest, and past north or north of the observer within twelve to twenty-four hours, depending on the force of the wind. If the wind is from the north or north-northwest, the barometer falls slowly, according to the force of the wind, and the storm will pass north or north-north of the observer within twelve to twenty-four hours with a north or north-north wind. The regularity of the storm's approach will be indicated by the rate at which the barometer falls.

Report from Atlantic and European statistics

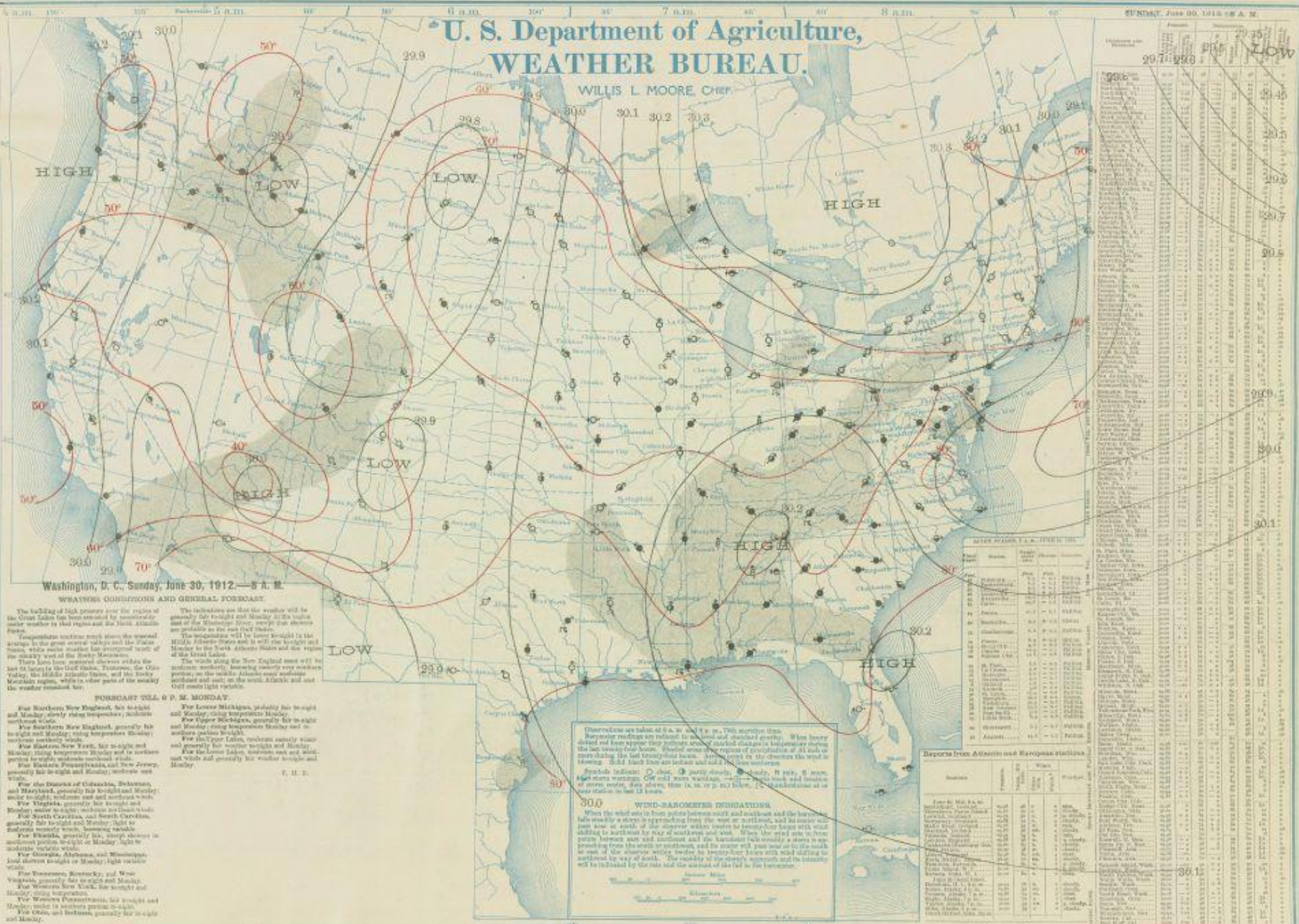
Description	FY 2003				FY 2002 Total
	Program	Sub	Line	Item	
General Fund, 1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 1-7, 1-8, 1-9, 1-10, 1-11, 1-12, 1-13, 1-14, 1-15, 1-16, 1-17, 1-18, 1-19, 1-20, 1-21, 1-22, 1-23, 1-24, 1-25, 1-26, 1-27, 1-28, 1-29, 1-30, 1-31, 1-32, 1-33, 1-34, 1-35, 1-36, 1-37, 1-38, 1-39, 1-40, 1-41, 1-42, 1-43, 1-44, 1-45, 1-46, 1-47, 1-48, 1-49, 1-50, 1-51, 1-52, 1-53, 1-54, 1-55, 1-56, 1-57, 1-58, 1-59, 1-60, 1-61, 1-62, 1-63, 1-64, 1-65, 1-66, 1-67, 1-68, 1-69, 1-70, 1-71, 1-72, 1-73, 1-74, 1-75, 1-76, 1-77, 1-78, 1-79, 1-80, 1-81, 1-82, 1-83, 1-84, 1-85, 1-86, 1-87, 1-88, 1-89, 1-90, 1-91, 1-92, 1-93, 1-94, 1-95, 1-96, 1-97, 1-98, 1-99, 1-100, 1-101, 1-102, 1-103, 1-104, 1-105, 1-106, 1-107, 1-108, 1-109, 1-110, 1-111, 1-112, 1-113, 1-114, 1-115, 1-116, 1-117, 1-118, 1-119, 1-120, 1-121, 1-122, 1-123, 1-124, 1-125, 1-126, 1-127, 1-128, 1-129, 1-130, 1-131, 1-132, 1-133, 1-134, 1-135, 1-136, 1-137, 1-138, 1-139, 1-140, 1-141, 1-142, 1-143, 1-144, 1-145, 1-146, 1-147, 1-148, 1-149, 1-150, 1-151, 1-152, 1-153, 1-154, 1-155, 1-156, 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U. S. Department of Agriculture, WEATHER BUREAU.

WILLIS L. MOORE, CHIEF

SUNDAY, June 30, 1912, 5 A. M.



Washington, D. C., Sunday, June 30, 1912—5 A. M.

WEATHER CONDITIONS AND GENERAL FORECAST.

The falling of high pressure over the region of the Great Lakes has been attended by considerably cooler weather in that region and the South Atlantic States. Temperature continues much above the seasonal average in the great central valley of the United States, while some stations have recorded signs of the change west of the Rocky Mountains. There have been scattered showers within the last 24 hours in the Gulf States, Tennessee, the Ohio Valley, the Middle Atlantic States, and the Rocky Mountain region, while in other parts of the country the weather remained dry.

FORECAST FOR 24 HOURS, MONDAY.

For Northern New England, fair tonight and Monday, slowly rising temperature; moderate northwest wind.
For Southern New England, generally fair tonight and Monday; rising temperature Monday; moderate northwest wind.
For Eastern New York, fair tonight and Monday; rising temperature Monday; light to moderate breeze from northwest to north.
For Eastern Pennsylvania, New Jersey, generally fair tonight and Monday; moderate west wind.
For the District of Columbia, Delaware, and Maryland, generally fair tonight and Monday; moderate northwest and north winds.
For North Carolina, and South Carolina, generally fair tonight and Monday; light to moderate north wind, becoming variable.
For Florida, generally fair, some showers in southern portion tonight and Monday; light to moderate, variable wind.
For Georgia, Alabama, and Mississippi, hot, sunny tonight and Monday; light to moderate wind.
For Tennessee, Kentucky, and West Virginia, generally fair tonight and Monday; rising temperature.
For Western New York, fair tonight and Monday; rising temperature.
For Western Pennsylvania, fair tonight and Monday; moderate to heavy rain tonight and Monday.
For Ohio, and Indiana, generally fair tonight and Monday.

The indications are that the weather will be generally fair tonight and Monday in the region east of the Mississippi River, except that showers are probable in the east half of the States. The temperature will be lower tonight in the Middle Atlantic States and it will rise tonight and Monday in the South Atlantic States and the region of the Great Lakes.

The winds along the New England coast will be moderate northerly, becoming more westerly northward on the middle Atlantic coast westerly southeast and east; on the south Atlantic and Gulf coasts light variable.

F. H. L.

Observations are taken at 8 A. M. and 8 P. M. This morning there were heavy showers in the region of the Great Lakes and in the region of the Ohio Valley. The temperature was 60° at 8 A. M. and 65° at 8 P. M. The wind was from the north at 8 A. M. and from the south at 8 P. M. The barometer was 30.1 at 8 A. M. and 30.2 at 8 P. M.

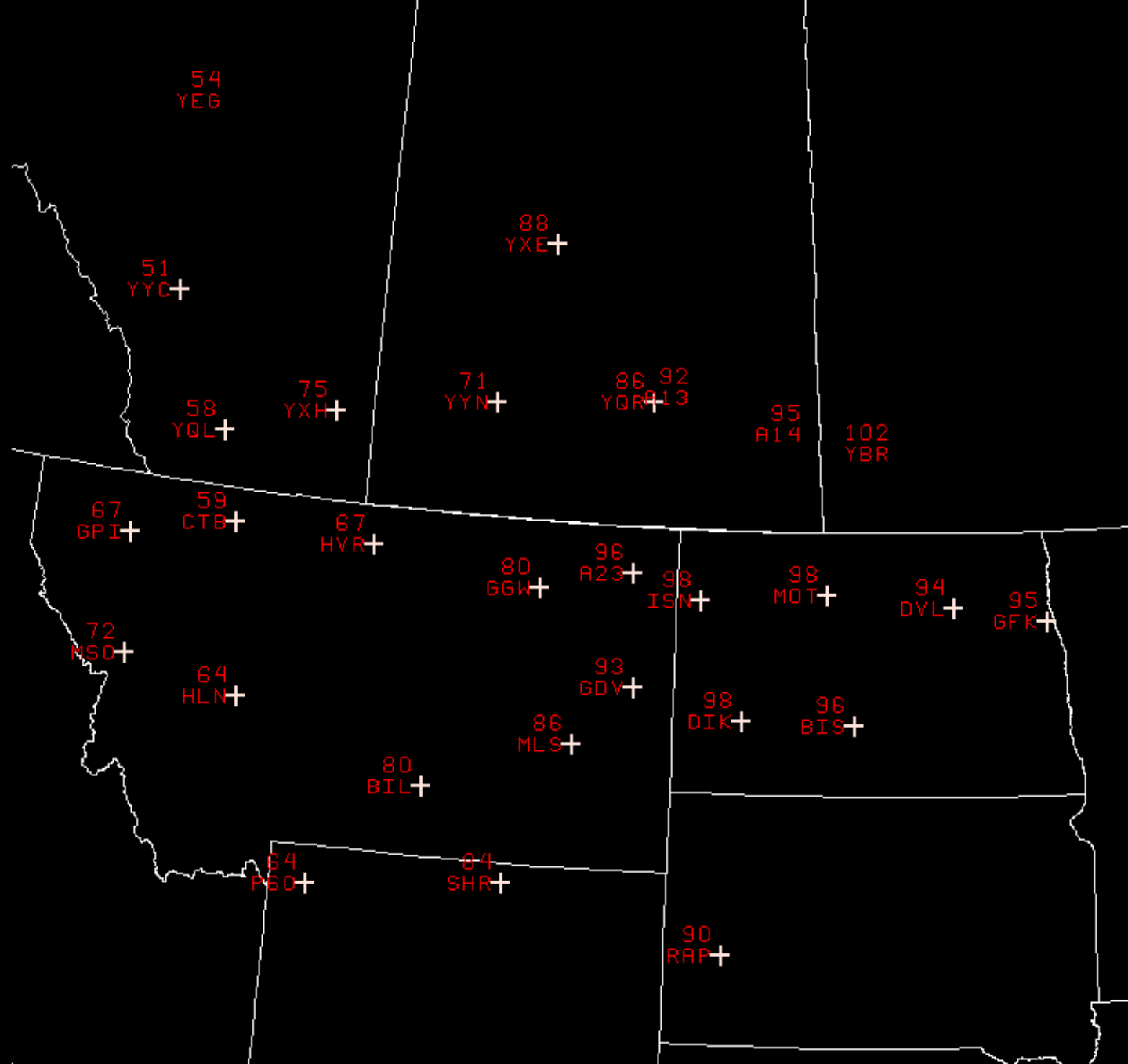
WIND-BAROMETER OBSERVATIONS.

When the wind sets in from points between north and northeast and the barometer falls steadily a storm is approaching from the west or northwest, and the more the barometer falls the more the storm is approaching. When the wind sets in from points between east and southeast and the barometer falls steadily a storm is approaching from the south or southwest, and the more the barometer falls the more the storm is approaching. When the wind sets in from points between south and southwest and the barometer falls steadily a storm is approaching from the south or southwest, and the more the barometer falls the more the storm is approaching. When the wind sets in from points between west and northwest and the barometer falls steadily a storm is approaching from the west or northwest, and the more the barometer falls the more the storm is approaching.

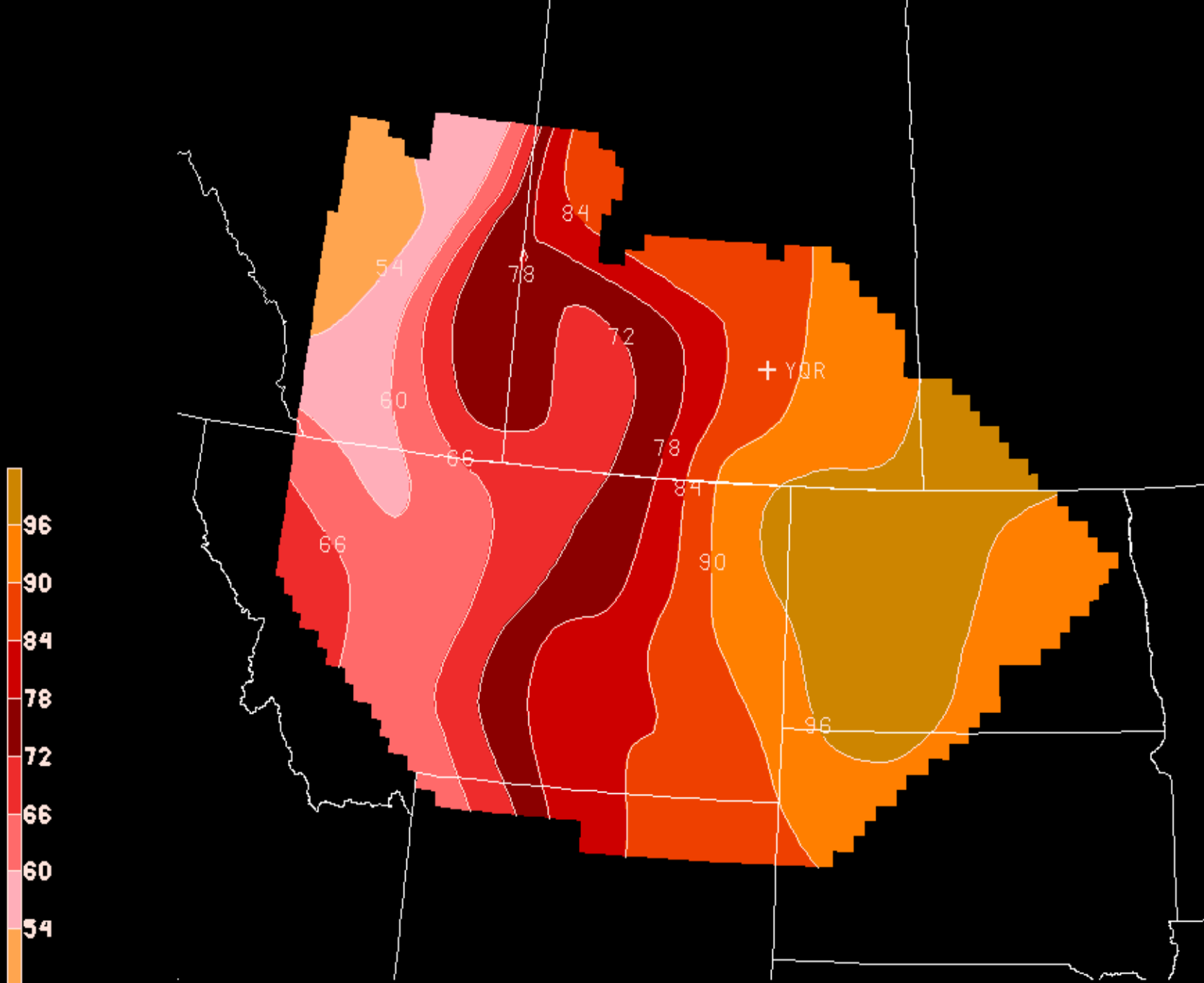
Station	Time	Wind	Barometer	Remarks
Albany, N. Y.	8 A. M.	N. by E. 10	30.1	
Boston, Mass.	8 A. M.	N. by E. 10	30.1	
New York, N. Y.	8 A. M.	N. by E. 10	30.1	
Philadelphia, Pa.	8 A. M.	N. by E. 10	30.1	
Washington, D. C.	8 A. M.	N. by E. 10	30.1	
Richmond, Va.	8 A. M.	N. by E. 10	30.1	
Norfolk, Va.	8 A. M.	N. by E. 10	30.1	
Roanoke, Va.	8 A. M.	N. by E. 10	30.1	
Charlottesville, Va.	8 A. M.	N. by E. 10	30.1	
Richmond, Ky.	8 A. M.	N. by E. 10	30.1	
Cincinnati, O.	8 A. M.	N. by E. 10	30.1	
Cleveland, O.	8 A. M.	N. by E. 10	30.1	
Chicago, Ill.	8 A. M.	N. by E. 10	30.1	
St. Louis, Mo.	8 A. M.	N. by E. 10	30.1	
Indianapolis, Ind.	8 A. M.	N. by E. 10	30.1	
Des Moines, Ia.	8 A. M.	N. by E. 10	30.1	
Sioux Falls, S. D.	8 A. M.	N. by E. 10	30.1	
Omaha, Neb.	8 A. M.	N. by E. 10	30.1	
Lincoln, Neb.	8 A. M.	N. by E. 10	30.1	
St. Paul, Minn.	8 A. M.	N. by E. 10	30.1	
Duluth, Minn.	8 A. M.	N. by E. 10	30.1	
Superior, Wis.	8 A. M.	N. by E. 10	30.1	
Green Bay, Wis.	8 A. M.	N. by E. 10	30.1	
Milwaukee, Wis.	8 A. M.	N. by E. 10	30.1	
Chicago, Ill.	8 P. M.	S. by E. 10	30.2	
St. Louis, Mo.	8 P. M.	S. by E. 10	30.2	
Indianapolis, Ind.	8 P. M.	S. by E. 10	30.2	
Cincinnati, O.	8 P. M.	S. by E. 10	30.2	
Cleveland, O.	8 P. M.	S. by E. 10	30.2	
Chicago, Ill.	8 P. M.	S. by E. 10	30.2	
St. Louis, Mo.	8 P. M.	S. by E. 10	30.2	
Indianapolis, Ind.	8 P. M.	S. by E. 10	30.2	
Cincinnati, O.	8 P. M.	S. by E. 10	30.2	
Cleveland, O.	8 P. M.	S. by E. 10	30.2	
Chicago, Ill.	8 P. M.	S. by E. 10	30.2	

Reports from Atlantic and European stations.

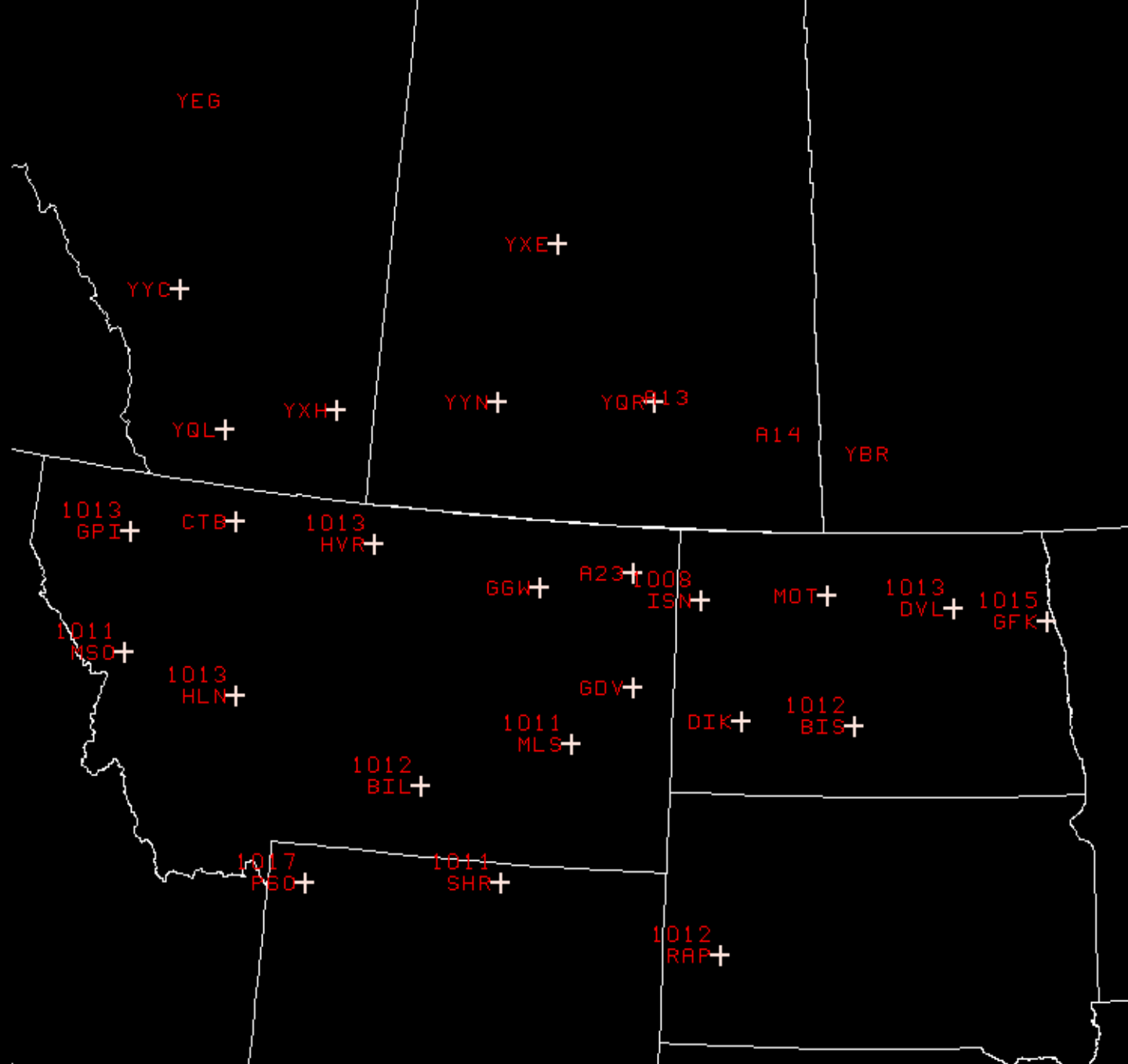
Station	Time	Wind	Barometer	Remarks
London, Eng.	8 A. M.	N. by E. 10	30.1	
Paris, Fr.	8 A. M.	N. by E. 10	30.1	
Berlin, Ger.	8 A. M.	N. by E. 10	30.1	
Rome, Ital.	8 A. M.	N. by E. 10	30.1	
Naples, Ital.	8 A. M.	N. by E. 10	30.1	
Genoa, Ital.	8 A. M.	N. by E. 10	30.1	
Lyon, Fr.	8 A. M.	N. by E. 10	30.1	
Marseilles, Fr.	8 A. M.	N. by E. 10	30.1	
Algiers, Alg.	8 A. M.	N. by E. 10	30.1	
Tunis, Alg.	8 A. M.	N. by E. 10	30.1	
Constantinople, Tur.	8 A. M.	N. by E. 10	30.1	
Yokohama, Jap.	8 A. M.	N. by E. 10	30.1	
Manila, Phil.	8 A. M.	N. by E. 10	30.1	
San Francisco, Cal.	8 A. M.	N. by E. 10	30.1	
San Diego, Cal.	8 A. M.	N. by E. 10	30.1	
Los Angeles, Cal.	8 A. M.	N. by E. 10	30.1	
San Jose, Cal.	8 A. M.	N. by E. 10	30.1	
San Francisco, Cal.	8 P. M.	S. by E. 10	30.2	
San Diego, Cal.	8 P. M.	S. by E. 10	30.2	
Los Angeles, Cal.	8 P. M.	S. by E. 10	30.2	
San Jose, Cal.	8 P. M.	S. by E. 10	30.2	
San Francisco, Cal.	8 P. M.	S. by E. 10	30.2	

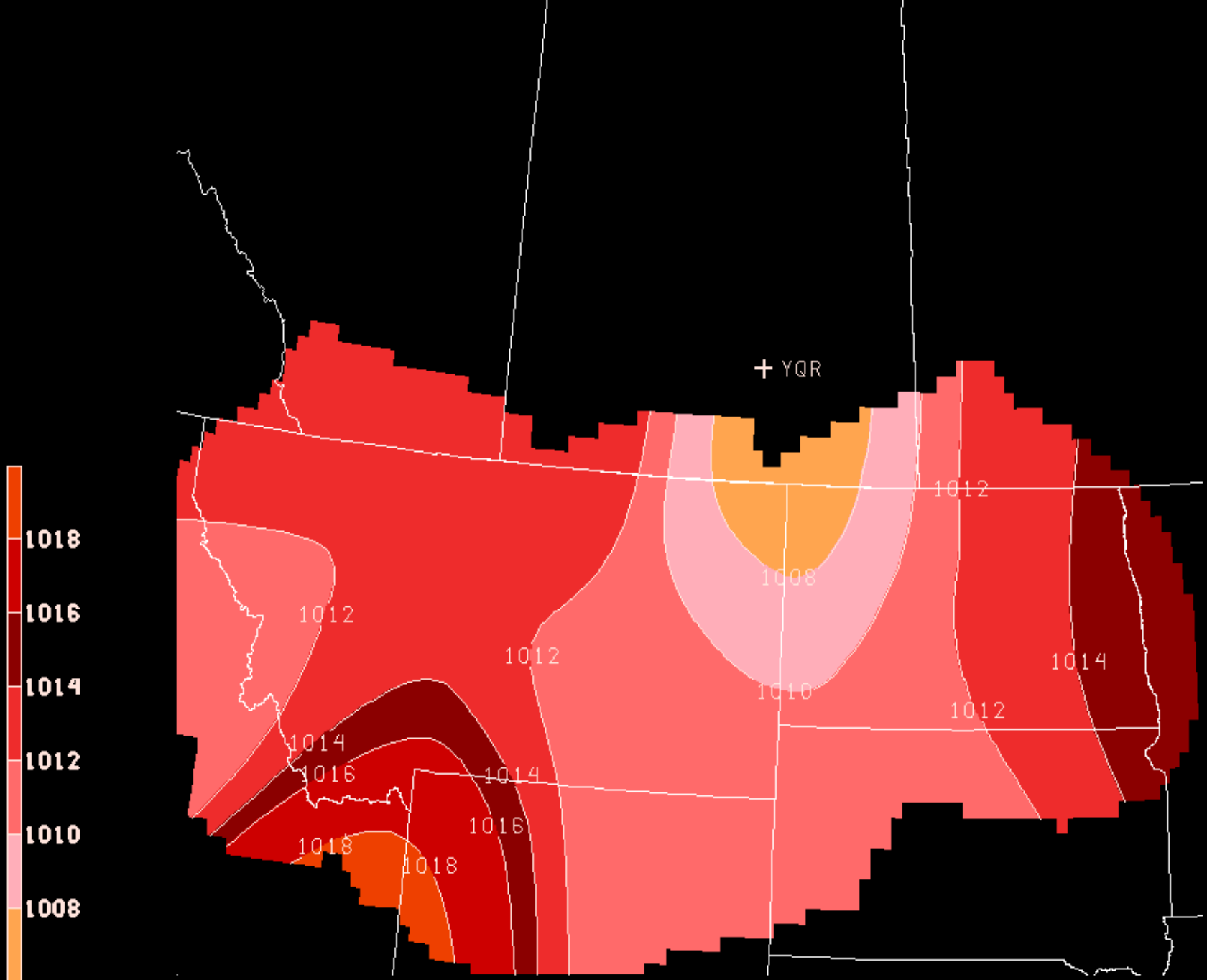


MAX T, deg. F. June 30 1912 --- Regina Cyclone



MAX T, deg. F. June 30 1912 --- Regina Cyclone





MAX T, deg. F. June 30 1912 --- Regina Cyclone

Conclusions Etc.

- Hot temperatures and anomalously high moisture
- Strong Cold Front
- Position of Surface Low and Unusual Track
- High CAPE vs High Shear?
- Upper Level Pattern?
- Upper Level Forcing?
- Storm Organization?
 - Cell Merger?
 - HP Supercell?



Sources

- **Climate data:** *xmClimate*, *xmAcis*, Environment Canada:
<http://www.climate.weatheroffice.ec.gc.ca/climateData>
- Surface Low Tracks: Monthly Weather Review, June 1912
- **Daily Weather Maps:**
http://docs.lib.noaa.gov/rescue/dwm/data_rescue_daily_weather_maps.html
- **Photographs:** Regina Leader Post, Regina Cyclone Souvenir
- *The CBC Digital Archives Website*, Canadian Broadcasting Corporation:
http://archives.cbc.ca/environment/extreme_weather/clips/11750/
- Saskatchewan Council for Archives and Archivists:
<http://scaa.usask.ca/gallery/regina/central/cyclone.html>
- The Encyclopedia of Saskatchewan:
http://esask.uregina.ca/entry/regina_cyclone.html